

Calculating REC Quantities and Capacity Factors

Capacity Factors

A Capacity Factor (CF) is used to determine the average annual production a PV system will produce during the 15-year Renewable Energy Credit (REC) period. There are two potential Capacity Factors (PVWatts and Alternate) used in ILSFA. The Approved Vendor should use the CF they feel will most accurately reflect the system's production. There are restrictions on when the PVWatts CF can be used, as specified in the Approved Vendor Manual. Please contact your Approved Vendor Manager directly or ILSFA vendors at vendors@IllinoisSFA.com if there are any questions.

Renewable Energy Credit Calculations

The Renewable Energy Credit (REC) generation a project will produce over the 15-year REC contract term can be calculated by the following equation:

{Equation 1} Traditional REC Calculation

REC Quantity = System (inverter) size in MW AC x Approved capacity factor x 365 days/year x 24 hours/day x 15 years

Where:

- System (inverter) size, the AC system size is the sum of all rated inverter maximum AC outputs [MW]
- Approved capacity factor, CF is the chosen Capacity Factor (PVWatts or Alternate)
- 365 is the number of days in a year [days/year]
- 24 is the number of hours in a day [hours/day]
- 15 is the number of years of the REC contract [years]

An equivalent equation can be used for system sizes rated in kW AC. (The ILSFA AV Portal uses kW AC)

{Equation 1.1} Salesforce & ILSFA AV Portal REC Calculation

REC Quantity = (System (inverter) size in kW AC) /1000 x Approved capacity factor x 365 days/year x 24 hours/day x 15 years {Equation 1.1}

Where:

- System (inverter) size, the AC system size is the sum of all rated inverter maximum AC outputs [kW]
- 1000 is the conversion from kWh to REC (1 REC = 1000 kWh) [kWh]
- Approved capacity factor, CF is the chosen Capacity Factor (PVWatts or Alternate)
- 365 is the number of days in a year [days/year]
- 24 is the number of hours in a day [hours/day]
- 15 is the number of years of the REC contract [years]

The REC Quantity value will be rounded down to the nearest REC.

The total REC Payment is then the product of the REC Quantity and the REC Value.

{Equation 2} REC Payment Calculation

Total REC Payment [\$] = REC Quantity [REC] * REC Value [\$/REC]

Calculating Capacity Factors

The Capacity Factor is a relationship between the energy produced by a generator during a specific time period and the energy that could be produced in that time period (maximum continuous power * time).

- The range for Equation 1 & Equation 1.1 - CF is 0 to 1, or
- The range for the ILSFA AV Portal - CF is 0% to 100%. [%]

The PVWatts Capacity Factor

The PVWatts CF uses PVWatts and the actual information of the system (location, DC size, azimuth, tilt, mounting type, DC/AC ratio) to determine the predicted First Year Annual Generation. The PVWatts CF does not account for site-specific shading and cannot be used for site with shading.

The PVWatts CF is calculated by:

$$\text{PVWatts CF} = ((0.9657) * (\text{Estimated First Year Production from PVWatts})) / ((\text{System AC Capacity in kW}) * (8760))$$

Where:

- 0.9657 is a factor to convert the first year production to the average year
 - (to factor in the 0.5% degradation each year over the 15-year REC term)
- Estimated First Year Production is the value from PVWatts
- AC System Size, in kW, is the sum of all rated inverter maximum AC outputs
- 8760 is the number of hours in a year

The Alternate Capacity Factor

The Alternate CF uses solar design software (chosen by the AV) and the actual system design to determine the predicted First Year Annual Generation. This will be the most accurate and is able to account for shading objects and optimizers.

The Alternate CF is calculated by:

$$\text{Alternate CF} = \frac{(0.9657) * (\text{Estimated First Year Production from solar design software})}{(\text{System AC Capacity in kW}) * (8760)}$$

Where:

- 0.9657 is a factor to convert the first-year production to the average year
 - (to factor in the 0.5% degradation each year over the 15-year REC term)
- Estimated First Year Production is the value from the solar design software
- AC System Size, in kW, is the sum of all rated inverter maximum AC outputs
- 8760 is the number of hours in a year